

The Oldest Toromiro in the World

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Ironically, the best known tree of Easter Island, the *Sophora toromiro* (Philippi) SKOTTSBERG, or commonly, the *toromiro* and sometimes *miro*, no longer grows there, at least not in the wild. The numerous (endemic) *toromiro*s that were once there were either cut down by the Islanders to use for making implements, for carving, and in construction and cooking, or else destroyed by the tens of thousands of sheep that roamed relatively freely over the Island.

The *toromiro* is a bean tree, a legume or fabaceous plant, one of about 45 species of the genus *Sophora* found mainly in the northern hemisphere. Tsoon & Ma (1981) have noted, however, that the *toromiro* and ten other members of the genus, including *S. microphyllum*, *S. tetraptera*, and *S. fernandeziana*, grow on islands in the South Pacific and in southwestern South America, mainly Chile. Christensen & Schlätzer (1993) report other species on Gough Island in the South Atlantic and on Reunion Island in the Indian Ocean.

A small number of *Sophora toromiro*s survive in various botanical parks and private gardens, and determined efforts are underway to increase their numbers and re-introduce them to Rapa Nui. See news article in *RNJ* 9(2):57. Recently, the discovery that there actually grew unnoticed a *toromiro* in the botanical garden in Bonn, Germany, led to several articles that included in their titles expressions such as "the lost tree of Easter Island" (Lobin & Barthlott 1988), and "an extinct plant is rediscovered" (Aldén & Zizka 1989). Meanwhile, a mature *toromiro* tree was thriving in the *Jardín Botánico* in Viña del Mar.

In recent years my wife and I have made a study of the specimens in Bonn, New Zealand and Viña del Mar and spoken at length with botanists there and elsewhere. In this article I will give a bit of the sad, past history of the tree, and then report on some conclusions that I, an amateur botanist, have made. I believe that in the end, readers will agree with me that the oldest *toromiro* in the world lives (happily and healthily) in the *Jardín Botánico* in Viña del Mar, Chile. It celebrates its 60th birthday this year.

The History

The major chronological events pertaining to the *Sophora toromiro*, as they have been recorded, are summarized below. My information comes from many sources but the salient facts (and some fiction) can be found in Métraux (1935), Heyerdahl and Ferdon (1961), Rodríguez, Matthei & Quezada (1983), Aldén and Zizka (1989), Godley (1989) Fischer (1993), Bahn & Flenley (1993) and Christensen & Schlätzer (1993).

1722: Jakob Roggeveen, the first westerner to visit Rapa Nui, wrote that the islanders "are destitute of heavy or thick timber", but his companion C.F. Behrens does refer to some woodland seen in the distance.

1770: Members of the expedition led by Felipe González

report "not a single tree is to be found capable of furnishing a plank so much as six inches in width. . . Its trees are very similar to mimosas and tamarinds." The largest were a little more than an *estada* (3.28 meters) tall.

1774: The naturalist, George Forster, who accompanied Captain James Cook on his second voyage to the Pacific, sees small trees growing on hills in small shrubberies which he calls mimosas. Forster estimates a maximum height of 9 or 10 feet and says it had a trunk at the base "as thick as a man's thigh".

1866: Hippolyte Roussel mentions thickets of *toromiro* on the outer slope of Rano Kau.

1871: The Chilean I. L. Gana describes "innumerable dry trunks (of *toromiro*) from 6 to 10 feet high" and attributes the disappearance of the tree to the ravages of cattle and sheep.

1888: W. J. Thomson reports seeing considerable numbers of *toromiro* but "all or nearly all are dead and decaying by reason of being stripped of their bark by the flocks of sheep which roam at will all over the island."

1911: Chilean botanist F. Fuentes notes that the *toromiro* is "very scarce, only in the Rano Kau crater". He considers it to be the same species as the Chilean *Sophora tetraptera*. With him is Dr. Walter Knoche who disagrees, considering the *toromiro* to be a separate species and endemic to the island.

1917: Carl Skottsberg finds only one living example. It is 1.9 meters tall and growing in the Rano Kau crater. He states that its closest relative is *S. masafuerana* from the Juan Fernández (Robinson Crusoe) Islands. He adds that *toromiro* is "easily distinguished from the other members of the section *Edwardsia*, and there is no *Edwardsia* in Melanesia or in the part of Polynesia from where the Easter Islanders are supposed to have come." Heyerdahl, of course, suggests that it was introduced to the island from Juan Fernández or South America.

1922: New Zealander botanist John Macmillan Brown states that "the *miro*, a tree exactly the same as the yellow-flowered *kowha* of New Zealand", can be found "away down the crater of Rano Kau". (The *kowha*, or *kowhai*, is the *maori* name of the *Sophora microphylla* in New Zealand). According to Dr. H. Gilpin, then Director of Parks & Reserves in Christchurch, Brown brings back three seeds.

1928: A Mr. Barnett arrives in Christchurch to become the next Director of Parks & Reserves and is given one (1) of the seeds collected by Brown. According to what Barnett later told Gilpin, the tree now growing in Christchurch grew from that single six year old seed.

1929: There is evidence that seeds were collected by S. Routledge. These were found relatively recently in the herbarium collection of the Royal Botanic Gardens, London.

1934: The last surviving *toromiro* in the wild was seen by

a number of visitors to Easter Island, among them I. Drapkin, E. Volovsky, and (possibly) Alfred Métraux; Volovsky described it as being 3 meters tall with a trunk 25 cm in diameter.

1935: Botanist Carlos Muñoz P., head of the Department of Investigations of CONAF, the Chilean National Park Service, undertook the task of collecting examples of all the rare and endangered trees in Chile. He dispatched a colleague to Rapa Nui to collect specimens of exotic or endangered plants. From these seeds he grew a number of plants, and he distributed them to, among others, the Botanic Garden in Viña del Mar (Muñoz 1959). This tree, located in a shaded and protected ravine, is in robust health and stands nearly two meters tall.

Developments since 1955

Few further references were made to the *toromiro* until 1955-56 when Heyerdahl's Norwegian Expedition carried out their well-known investigations. At the request of the palynologist Olof Selling in Stockholm, Heyerdahl's team took some core samples from the two major craters and collected some seeds from the last "dwarfed and mutilated" *toromiro*; Selling in turn passed them on to the Botanic Garden in Goteborg. From the core samples, Selling deduced that the *toromiro* was at earlier times much more common. As for the seeds, some germinated several years later (in 1959), and two examples continue to do well. The last survivor in the wild finally expired without ceremony a few years after Heyerdahl harvested the seeds.

From these two Goteborg plants and at various time, seeds were sown and cuttings rooted, and specimens were, evidently, sent directly or indirectly to several botanic gardens including those in Regensburg, Heidelberg, Bonn and London. In 1988 Bjorn Aldén of Goteborg brought two young plants to Easter Island where, in the presence of Thor Heyerdahl and a camera crew, they were planted outside of the Rano Kau crater. (Aldén reports that "one third of the two weeks spent on Easter Island was spent on the ceremonies, etc.") Neither of the young *toromiro*s survived.

In 1966-68 on invitation from the Chilean Ministry of Agriculture, G. Schlätzer planted seeds taken from the tree in Christchurch in the Rano Kau crater. As Christensen & Schlätzer (1993) write, "A fence was placed across the foot of Rano Kau, and behind that many *Toromiro*s were planted among many other species. . . including *Toromiro*s". Exactly where "the foot of Rano Kau" is located was not made clear. Also, a reader would conclude from their statement that other *toromiro*s were growing in the wild nearby at that time.

Eric Godley (1989) reinvestigated the *Sophora* growing in Christchurch and expressed serious doubts that it came from Easter Island saying "the main differences from the description of the *toromiro* given by Skottsberg (1920) are the larger size of the tree, the longer leaves, and the larger number of leaflets, each of which is more rounded." It is important to note that when Godley refers to "leaves", he means entire twigs each bearing numerous small "leaflets".

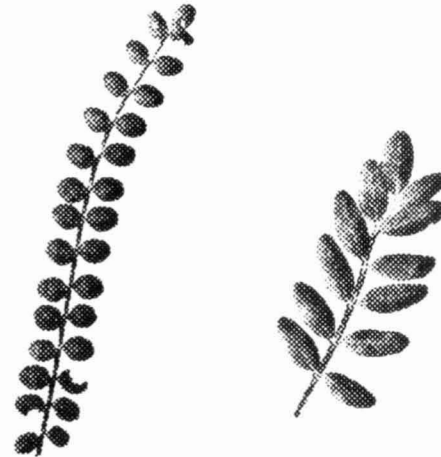


Figure 1. Leaves from the *Sophora* trees in Christchurch, New Zealand (left), and in Viña del Mar. As is immediately obvious, the much more numerous leaflets from the Christchurch tree are much more rounded than those of the Viña del Mar specimen.

In Godley's opinion "these differences. . . should lead us to classify the tree as of uncertain origin", and he concluded that it "would be wrong to use seed from this tree in attempt to restock Easter Island with the *toromiro*". Clearly, Godley was unhappy with the Christensen & Schlätzer replantation.

In an apparent attempt to settle the matter, the case was put before the Botanical Officer in Christchurch, Mrs. J. V. McNaughton. In 1991 she wrote to Schlätzer and stated that they do consider this tree to be a *toromiro*, an obvious contradiction to Dr. Godley, the retired Director of the Botany Division of the Department of Scientific and Industrial Research in Christchurch.

In their 1993 paper Christensen & Schlätzer criticize both Godley and Aldén. They write: "Dr Aldén (1990). . . alleged that all the formerly planted (by Schlätzer) *Toromiro*s had died, that they were seedlings of a New Zealand *Sophora microphylla*, mistaken by Christchurch Botanic Garden for a *Toromiro*, and that the botanic garden had admitted their tree to be a misnomer." And they ask pointedly, "Could a well-reputed botanic garden like Christchurch really make such a mistake?" They also reprimand Aldén for saying that "all the formerly planted *Toromiro*s had died" without even asking where they were planted. They later note that "in 1966-68, we hid some of the *Toromiro* plants because of the fame and former use of the tree for the famous wood carvings."

Christensen & Schlätzer conclude finally that "neither Aldén nor Godley has produced one indisputable character to prove that the Christchurch tree cannot safely be considered a *Toromiro*." They then argue that the *toromiro* is a variation of the *S. microphylla*, noting that representatives of another species, *Sophora macrocarpa*, growing on the same estate in Chile, show considerable variation.

In their paper Christensen & Schlätzer consider the detailed descriptions of the several *toromiro* candidates--the size, shape and color of their flowers, seeds, leaves and leaflets. On one point, all the experts--Skottsberg, Aldén, Zizka, Godley, and Christensen & Schlätzer--seem to agree: the number of leaflets is the most reliable characteristic. From various sources, I have compiled the following table.

| Location of Tree | Length of Leaf | Number of Leaflets | Dimensions of middle leaflet |
|------------------|----------------|--------------------|------------------------------|
| Viña del Mar | 2.5-5.0 cm | 7-12 | 10x3mm |
| Bonn | 5.0-8.0 | 13-23 | 12x5 |
| Christchurch | 6.0-10.5 | 35-44 | 4.3x3.5 |

Note: Much of the above data are from my own measurements; additional information taken from Rodríguez et al. 1983 (Viña del Mar); Lobin & Barthlott 1988 (Bonn); and Godley 1989 (Christchurch).



Figure 2. The *Sophora* in the Botanic Garden in Bonn. It is thought to be about 20 years old, an offspring of one of the trees from Goteburg, Sweden. Photo: Prof. Dr. W. Barthlott and the Botanisches Institut of the University of Bonn.

To conclude this section, I should note that the Christchurch tree grows not in the Botanic Garden but in Victoria Park on the hills to the east of the city. When my wife and I inspected the tree in June of 1994, it measured approximately 4 meters high and seemed reasonably healthy despite some recent vandalism. (According to the Administrative Officer of the Botanic Garden, Ms. Susan Molloy, and resident botanist Andrew Hodge, the damage had been done by local "bikies"--motorcycle gangs--who

frequent the public park at night.) In the Botanic Garden itself, several young plants were thriving having been grown from seeds of the Victoria Park specimen.

So which is the Oldest?

A consideration of the table above argues strongly against the Christchurch specimen being a true *toromiro*. One notices immediately the rather divergent number of leaflets, but perhaps more significantly, the shape of the leaflets is strikingly different: in the Christchurch tree, the leaflets are much more rounded compared with the strongly elliptical leaflets from the other trees. This difference can be seen clearly in the accompanying photocopy made from samples from the Christchurch and Viña trees. When Christchurch botanist Andrew Hodge and I compared these leaf samples, he immediately gave his opinion: the Christchurch tree is not a *toromiro*.

In all fairness, it should be emphasized that Christensen & Schlätzer argue that the differences in the leaf and leaflet characteristics can be ascribed to genetic variations and different growing conditions. Also, Godley states that the closely related *Sophora microphylla*, of which many varieties grow in New Zealand, is extremely variable, owing no doubt to cross-pollination.



Figure 3. The flowers of the *Sophora* are a bright yellow color; these are from the same tree as shown in Figure 2. Photo: Prof. Dr. W. Barthlott and the Botanisches Institut of the University of Bonn.

Christensen & Schlätzer note that Valparaíso, the city next to Viña del Mar, receives 462 mm of precipitation a year with a summer minimum; Easter Island 1,274 mm evenly distributed over the year; and Christchurch 669 mm. They were apparently unaware, as I have recently learned, that the tree in Viña is watered regularly during the summer.

To this it can be added that the temperatures are somewhat more extreme in Viña del Mar, and much more so in Christchurch, than on Easter Island, especially in the crater of Rano Kau. (The tree in Bonn is moved to a greenhouse every winter.)

However, given the "vague history" of the Christchurch tree (Godley's comment) and the report that it supposedly grew from a single 6-year-old seed, one must seriously question its true identity. Moreover, it is difficult to accept the argument that genetic variations could produce such an extreme difference in the shape and number of the leaflets. Most importantly, as Godley writes, "Unless more accurate records are found, it would be wrong to use seed from (the Christchurch) tree in an attempt to re-stock Easter Island with the *toromiro*s."



Figure 4. Alive and well in Viña del Mar, Chile: the world's oldest *Sophora toromiro*.

In conversations I have had recently with Melica Muñoz, daughter of Carlos Muñoz and herself a botanist at the National Museum of Natural Science in Santiago, I have learned that her late father also planted a *toromiro* in their garden in Santiago. Despite the less than ideal growing conditions in that city such as stifling smog and freezing temperature, it does well and blooms profusely (in alternate years).

Another *toromiro*, grown from seeds taken from the tree in Viña del Mar, survives in our own private garden. Three years ago my wife and I rescued it from an ignominious death in the garden of a recently deceased amateur botanist in Viña who, according to his wife, planted it "in about 1968". Their house had recently been sold and the grounds were being

scalped to make way for a new bank building.

In conclusion, all available data and evidence support the claim that the 60-year old *Sophora toromiro* in Viña is the oldest living example. Furthermore, its history is well documented (Muñoz 1959). Standing a little under two meters high with a trunk about 16 cm in diameter, it grows in the CONAF nature preserve on the side of a slope leading down to a tributary of the river Marga-Marga. It is in an isolated spot surrounded on all sides by large trees, primarily eucalyptus. The area, approximately five kilometers from the Pacific Ocean, enjoys a mild, well-protected micro-climate, and is easily found and visited. I suggest that the next time you are in Chile, you pay a visit to what is certainly the oldest *toromiro* in the world.

I should like to thank the many people with whom I have discussed *S. toromiro* and the kindness they have shown in taking time to educate me. Special thanks go to Gerardo Velasco, Melica Muñoz, José Miguel Ramírez, Georg Zizka, Wolfram Lobin and Wilhelm Barthlott, Susan Molloy and Andrew Hodge, and the family of Italo Traverso whose *toromiro* now grows in our garden.

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